21.32 MESH

MESH generates a mesh or reads a previously generated mesh.

Syntax

```
MESH <prev>|<new> [<output>]
```

Parameter	Type	Default	Units
ATHENA	Logical	False	
AUTO	Logical	False	
CONDUCTOR	Logical	False	
CYLINDRICAL	Logical	False	
DATAFILE.ISE	Character		
DIAG.FLIP	Logical	True	
ELEC.BOT	Logical	False	
GRIDFILE.ISE	Character		
FLIP.POS	Real	Midpoint	μm
FLIP.Y	Logical	False	
IN.FILE	Character		
INFILE	Character		
MASTER.IN	Logical	True	
MASTER.OUT	Logical	True	
MINOBTUSE	Logical	False	
NX	Integer		
NY	Integer		
NZ	Integer		
OUT.FILE	Character		
OUTFILE	Character		
PERIODIC	Logical	False	
PISCES.IN	Logical	False	
RECTANGULAR	Logical	True	
SCALE	Integer	1	
SCALE.X	Integer	1	

Parameter	Type	Default	Units
SCALE.Y	Integer	1	
SCALE.Z	Integer	1	
SMOOTH.KEY	Integer		
SPACE.MULT	Real	1.0	
THREE.D	Logical	False	
TIF	Logical	False	
VERT.FLIP	Logical	False	
WIDTH	Real	1.0	μm
Z.EPI	Logical	False	

Description

prev	This is a set of parameters that allows you to read a previously generated mesh type.
new	This is a set of parameters that allow you to initiate the generation of a rectangular mesh.
output	This is a set of the parameters for saving the mesh.

Mesh File Parameters

CONDUCTOR	Interprets metal regions loaded in with the INFILE parameter as conductors .
CYLINDRICAL	Specifies that the mesh being read in contains cylindrical symmetry. Since this information is not saved in the mesh file, the CYLINDRICAL parameter must be specified each time a structure with cylindrical symmetry is loaded.
DATAFILE.ISE	Specifies the name of the data file for ISE formatted structures.
FLIP.Y	Reverses the sign of the Y coordinate.
GRIDFILE.ISE	Specifies the name of the grid file for ISE formatted structures.
IN.FILE	This is a synonym for INFILE.
INFILE	Specifies the name of a previously generated mesh that has been saved to disk. The synonym for this parameter is IN.FILE.

MASTER.IN	Specifies a filename to read mesh and doping information in the Silvaco Standard Structure File (SSF) Format. This parameter is used to read ATHENA or DEVEDIT structure files. Typically, these files contain all REGION, ELECTRODE, and DOPING information. Although ATLAS allows you to modify the structure using these statements, this parameter is true by default and is the only file format supported by Silvaco.
PISCES.IN	Indicates that the mesh file is in the old PISCES-II format. This is not recommended or supported by Silvaco.
SCALE	Specifies a scale factor by which all X, Y, and Z coordinates are multiplied.
SCALE.X	Specifies a scale factor by which all X coordinates are multiplied.
SCALE.Y	Specifies a scale factor by which all X and Y coordinates are multiplied.
SCALE.Z	Specifies a scale factor by which all Z coordinates are multiplied.
SPACE.MULT	This is a scale factor that is applied to all specified grid spacings. This parameter can be used to produce a coarse mesh and thereby reduce the simulation time.
ATHENA	Reads mesh and doping data generated by the ATHENA PISCES-II format file. This parameter and file format is obsolete.

Mesh Parameters

AUTO	Specifies that mesh lines will be generated automatically from REGION statements. See "Specifying the Mesh" on page 497 for more information on how to specify mesh lines.
CYLINDRICAL	Specifies that the mesh contains cylindrical symetry. The exact meaning also depends on the state of the THREE.D parameter. If THREE.D is not set, the simulation will assume that a 2D mesh in X and Y coordinates is rotated by 360° about the Y axis. In this case, do not define mesh locations with negative X coordinates. Also, note that if such a structure is saved and re-loaded in subsequent simulations, the state of the CYLINDRICAL flag is lost and should be specified in each successive input deck.
DIAG.FLIP	Flips the diagonals in a square mesh about the center of the grid. If the parameter is negated, using DIAG.FLIP is specified, all diagonals will be in the same direction.
FLIP.POS	Works with DIAG.FLIP. If FLIP.POS is specified, the change of mesh diagonal direction occurs at the nearest mesh X coordinate to the value specified by FLIP.POS. If it is not specified, then the default value used is the average X coordinate of the device.
MINOBTUSE	Minimizes the generation of obtuse triangles during the 3D cylindrical meshing (see Section 2.6.9 "Specifying 3D Cylindrical Structures").
NX	Specifies the number of nodes in the X direction.
NY	Specifies the number of nodes in the Y direction.

NZ	Specifies the number of nodes in the Z direction, used in DEVICE3D only.
PERIODIC	Specifies the left and right edges of the device will be modeled as periodic (i.e., the solution along the right edge wraps around to the left edge and vice-versa).
RECTANGULAR	Initiates the generation of a rectangular mesh.
THREE.D	Starts ATLAS3D.
TIF	Specifies that structure file is in TIF format.
VERT.FLIP	Flips the direction of mesh triangle diagonals. In other words, the diagonals of the mesh are mirrored in the vertical direction. This also works in the XY plane for 3D structures generated within ATLAS.
WIDTH	Specifies a scale factor to represent the un-simulated dimension for 2D simulations. This scale factor is applied to all run time and log file outputs.
Z.EPI	Specifies that for calculation of uniaxial polarization charge in GaN/InGaN/AlGaN. We assume layers are stacked along the Z axis.

Output Parameters

OUT.FILE	This is a synonym for OUTFILE.
OUTFILE	Specifies the output filename to which the mesh is written. The synonym for this parameter is OUT.FILE.
MASTER.OUT	Specifies the format of the output file. This parameter is true by default so the output file will conform to the Silvaco Standard Structure File Format and can be plotted in TONYPLOT.
SMOOTH.KEY	Specifies a smoothing index. The digits of the index are read in reverse order and interpreted as follows: • Triangle smoothing. All region boundaries remain fixed. • Triangle smoothing. Only material boundaries are maintained. • Node averaging. • Improved triangle smoothing method. This method uses diagonal flipping to reduce the number of obtuse triangles. • Triangle smoothing by flipping diagonals according to electric field. Usually option 1 is sufficient. Option 2 is useful only if a device has several regions of the same material and the border between different regions is unimportant. Option 3 is not recommended when the initial mesh is basically rectangular, such as mesh information usually obtained from SSUPREM4. Option 4 is similar to Option 1 but Option 4 usually creates less obtuse triangles.

Mesh Definition Example

This example initiates a rectangular mesh and stores the mesh in file, `MESH1.STR`.

```
MESH RECTANGULAR NX=40 NY=17 OUTF=MESH1.STR
```

ATHENA Interface Example

This syntax reads in a mesh from ATHENA or DEVEDIT:

```
MESH INFILE=NMOS.STR
```

When the **auto-** interface feature is used in DECKBUILD, the program will automatically insert the MESH statement to load the result of previous programs into ATLAS.

Note: See Sections 2.6.1 "Interface From ATHENA" and 2.6.2 "Interface From DevEdit", or the on-line examples for details of the interfaces from ATHENA or DEVEDIT to ATLAS.